AD NUMBER

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TO

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AUTHORITY

AFMC ltr, 19 Feb 2002

SECRET
Security Information

Air Proving Ground Command

Letter Final Report

TEST CONDUCTED
----------AT----------
EGLIN A.F.B. FLORIDA

PROJECT NO. APG/TAT/90-A-3

SUBJECT: FLIGHT INVESTIGATION OF STABILITY FIX FOR F-86F AIRCRAFT

DATE 8 SEPTEMBER 1953 COPY NO. 7 OF 400

SECRET
Security Information

SECRET
By Authority of
Comdr, APGC
8 Sep 53
(Date) (Initials)

HEADQUARTERS
AIR PROVING GROUND COMMAND
Eglin Air Force Base, Florida

8 September 1953

SUBJECT: (Uncl) Letter Final Report on Flight Investigation of Stability Fix for F-86F Aircraft, Project No. APG/TAT/90-A-3

TO: Director of Requirements
Headquarters, USAF
Washington 25, D. C.

1. INTRODUCTION:

a. This test was conducted at the request of the Deputy Chief of Staff, Operations, Air Proving Ground Command, in a directive dated 8 June 1953, subject: "(Uncl) Flight Investigation of Stability Fix for F-86F (Project No. APG/TAT/90-A-3)." (See Appendix A.)

b. The F-86F tested in this project was the same aircraft tested in Project No. APG/TAT/90-A, "Operational Suitability Test of the F-86F Aircraft." However, the aircraft has been modified to increase the control sensitivity and maintain a more favorable center of gravity as outlined in Appendix B. A "6-3" wing leading edge was also installed.

2. OBJECT: To determine the effectiveness of the North American Aviation flight control modification upon presently unsatisfactory flight characteristics of the F-86F under combat configurations.

3. DISCUSSION:

a. General: The Final Report on the Operational Suitability Test of the F-86F indicated that there was a serious flight instability, described as porpoising, apparent in the aircraft when carrying certain external stores and flying at certain airspeeds. This was considered to be serious enough that the first recommendation in the report of the Operational Suitability Test was to initiate a study of the condition and, if possible, take action to increase the flight stability. North American Aviation has developed three (3) fixes covered by T. O. No. 01-60JLD-32, T. O. No. 01-60JLD-50 and ECP NA F-86F 218 to improve the

54AnA 38772

flight stability of the F-86F. These fixes were installed on the aircraft for this test.

b. Procedure:

(1) A series of missions, as outlined in Appendix C, were conducted to correspond to applicable missions included in the Operational Suitability Test of the F-86F, Project No. APG/TAT/90-A. When pilot availability would permit, the same pilots who participated in Project No. APG/TAT/90-A were utilized for this test.

(2) Standard Manual Pip Control dive bombing procedure was used. All other missions followed the techniques as outlined in the Final Report of Project No. APG/TAT/90-A.

4. RESULTS:

a. General: All pilots who participated in this test reported a marked improvement in the longitudinal stability and general flight characteristics under all configurations over that of the aircraft prior to this modification. The high speed, low altitude instability and the high altitude porpoising was greatly reduced in formation flights particularly with external stores. The comments of individual pilots are included in Appendix D.

b. Dive Bombing: The CEP was decreased from 277 feet with unmodified aircraft to 227 feet with modified aircraft, and the bomb dispersion around the target was greatly decreased. See Appendices E and F for bomb plots.

c. Ground Gunnery: The maximum hits obtained with the standard aircraft during the Operational Suitability Test was fifty-two (52) per cent with an average of thirty (30) per cent for that test as compared to a maximum of seventy-five (75) per cent with an average of thirty-eight (38) per cent hits obtained during this test. See Appendix G for gunnery scores.

5. CONCLUSIONS: The F-86F in the role of a fighter-bomber has been greatly improved by the modifications made to the flight controls.

6. RECOMMENDATIONS: Immediate action be taken to perform the modifications enumerated in Appendix B on all applicable F-86F aircraft.

PATRICK W. TIMBERLAKE
Major General, USAF
Commander

7 Incls:
1. Appendix A
2. Appendix B
3. Appendix C
4. Appendix D
5. Appendix E
6. Appendix F
7. Appendix G

C O P Y

DISPOSITION FORM

SUBJECT: (Uncl) Flight Investigation of Stability Fix for F-86F, Project No. APG/TAT/90-A-3

TO: D/OOTD FROM: D/OAT DATE: 8 Jun 53 COMMENT NO. 1

Lt Col Sharp/4201

Col Ham/23214

1. GENERAL:

a. The Final Report on the Operational Suitability Test of the F-86F indicated that there was a serious flight instability, described as porpoising, apparent in the aircraft under certain configurations and airspeeds. This was considered to be serious enough that the first recommendation of the report was to initiate a study of the condition and if possible take action to increase the flight stability. The North American Field Representative has received information that a fix, covered by ECP NA F-86F 218, T. O. No. 01-60JLD-32 and T. O. No. 01-60JLD-50, has been developed by his company and accepted by the USAF. The evaluation of this fix has been initiated by the Air Proving Ground Command and will be conducted with aircraft presently assigned. F-86F No. 52-4308 is now being modified with this fix for utilization during the investigation.

b. Classification: SECRET.

c. Priority: Hq USAF - 1A; APGC - 6A (list of 1 Jun 53).

d. Evaluation Officer: Lt Col D. F. Sharp.

2. OBJECT: To determine the effectiveness of the North American developed flight control modification upon presently unsatisfactory flight characteristics of the F-86F under some combat configurations.

3. SCOPE OF TEST:

a. The test program will be designed to evaluate improvements in the flying characteristics of the F-86F after the modifications proposed by North American Aviation Corporation has been installed.

b. Emphasis will be placed upon the determination of any improvement of the adverse and critical flying characteristics as outlined in the Final Report of the Operational Suitability Test of the

F-86F. It is estimated that sixteen (16) sorties should be sufficient to permit complete investigation of the following areas:

(1) High altitude formation with external fuel tanks and 1000-pound bombs installed.

(2) Dive and glide bombing from various altitudes.

(3) Air-to-ground gunnery with the emphasis on those airspeeds that were determined to be dangerous during the F-86F Operational Suitability Test.

(4) High speed, low altitude passes with external ordnance.

4. TIME PHASING:

a. The Operational Testing Division will, upon receipt of this directive, prepare a brief test program. This program will be designed as a follow-up of Project No. APG/TAT/90-A, Operational Suitability Test of F-86F.

b. F-86F No. 52-4308 will be modified under the North American representative's supervision and should be ready for testing by 8 June 53.

c. Physical testing should be completed ten (10) to fifteen (15) days after activation of the project.

5. REPORTS:

a. A report will be completed within seven (7) days after the completion of testing.

b. Distribution of this report will be the same as distribution of the Final Report of the Operational Suitability Test of the F-86F.

/s/ H. G. Brady
/t/ M. J. McKeever, Jr., Colonel
Asst. D/O, Test

C O P Y

MODIFICATIONS TO AIRCRAFT

1. The F-86F used on this project was modified with the following stability fixes:

a. Rework of horizontal stabilizer flight control system.

(1) This rework is covered by T. O. No. 01-60JLD-50.

(2) This rework was to improve the longitudinal control stability by providing a more favorable center-of-gravity condition and consists of reducing the weight of the bobweight, removal of the valve centering bungee, and a readjustment of the preload on the artificial feel bungee.

b. Replacement of artificial feel bungee.

(1) This rework is covered by T. O. No. 01-60JLD-32.

(2) This rework was to eliminate interference between the aircraft structure and horizontal stabilizer artificial feel bungee and to reduce excessive friction in the horizontal stabilizer control system.

c. Changes to fuel sequencing.

(1) This rework has not as yet been assigned a T. O. number. However, an Engineering Change Proposal No. 218 has been submitted and approved by Headquarters, USAF.

(2) This rework further improves the flight characteristics of the aircraft by providing a more favorable center-of-gravity condition by modifying the fuel sequencing so as to use fuel from the aft fuel cell before using fuel from the other internal fuel cells. This change consists of replacing the existing forward fuel cell transmitter which incorporates a transfer pump control switch for controlling fuel level and changing the fuel sequence wiring to accommodate the new transmitter.

2. A "6-3" wing leading edge was installed to replace the wing slats. This wing configuration is standard equipment of the aircraft. However, it was not available when the aircraft was procured for the Operational Suitability Test for the F-86F.

TEST PROCEDURE

1. Formation Flights: The modified F-86F with extended leading edges was flown with various configurations of external stores to determine the flight characteristics in formation flight from take-off to 40,000 feet at airspeeds up to 500 knots. Additional flights included high speed (580 knots IAS), runs at 1,000 feet altitude with various external configurations.

2. Dive Bombing: The modified F-86F with external fuel tanks and 500 and 1,000 pound bombs was utilized for dive bombing. Dives were made from twenty (20) to seventy (70) degrees, from 10,000 to 20,000 foot altitudes utilizing the Manual Pip Control device for bombing.

3. Ground Gunnery: The modified F-86F with and without external fuel tanks was utilized for making normal ground gunnery attacks firing all six (6) guns.

INDIVIDUAL PILOT'S COMMENTS

1. Due to the objective of this test, more emphasis is placed upon information contained in pilot reports, as discussed below, than accuracy achieved in dive bombing and gunnery.

2. Pilots' Comments:

a. Phase 1 - Dive bombing.

(1) Pilot M: This aircraft was extremely stable on all bombing runs executed. Control response to pull-out was normal and no tendency to porpoise was encountered. This is a marked improvement over the former stability of this aircraft.

(2) Pilot B: There is a marked improvement in the tracking ability of this aircraft as compared to that of the aircraft used for the operational suitability testing.

b. Phase 2 - Ground gunnery.

(1) Pilot M: This aircraft was very stable and accurate; tracking of ground target aiming points was executed with ease. This is a definite improvement in the aircraft as a gun platform.

(2) Pilot T: This aircraft is one of the best gun platforms I have used. Control action feels more positive and the aircraft responds to control pressure with less delay than formerly encountered in the F-86F. This aircraft is much better for strafing than it was prior to this modification.

(3) Pilot V: This aircraft handled extremely well compared to former F-86F aircraft I have flown. As a gun platform it now compares favorably to the F-84G.

c. Phase 3 - High altitude formation.

Pilot M: In all configurations of external stores this aircraft is very stable in formation. At altitudes of 40,000 feet, formation was flown with ease and no tendency to porpoise was encountered. In the speed range of 500 knots at low altitude, close formation is easily accomplished.

d. Phase 4 - High speed flight.

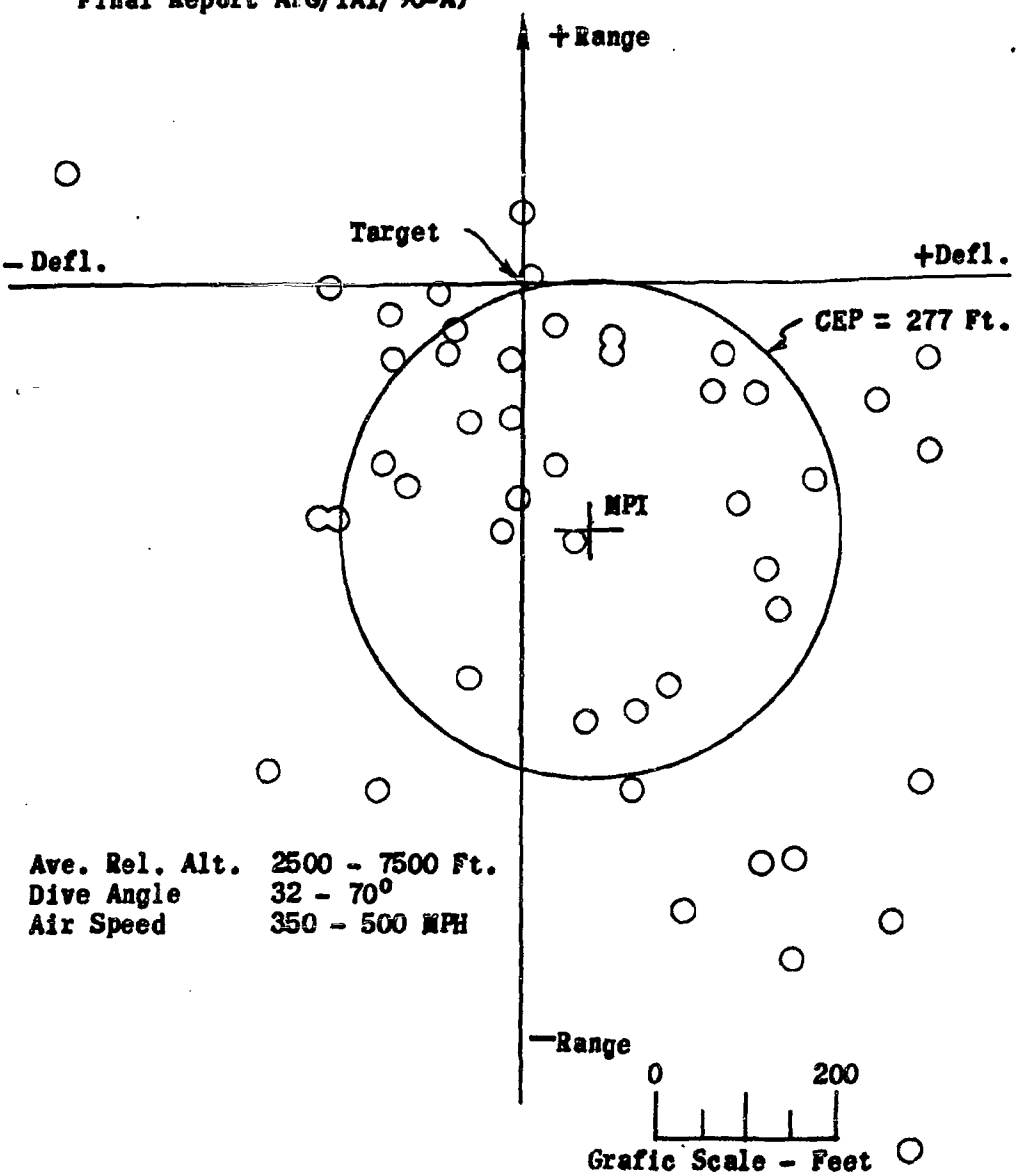
(1) Pilot M: At low altitude in the high speed ranges (400-520 knots) a mild porpoise can be encountered when carrying external stores. The degree of porpoise is proportional to the rate of change of control pressure that the pilot induces on the elevator. This condition is not a serious one as it can be minimized by smooth application of control pressure. There is an extreme improvement in this condition over the conditions encountered in the F-86F prior to this modification.

(2) Pilot B: The stability of this aircraft is greatly improved over that of the operational suitability test aircraft. (Low altitude high speed flights with aircraft equipped with external ordnance and fuel tanks have a less tendency to porpoise.) A porpoise, however, can be introduced to this aircraft when flying at speeds of 400-500 knots at low altitude when carrying external ordnance and fuel tanks.

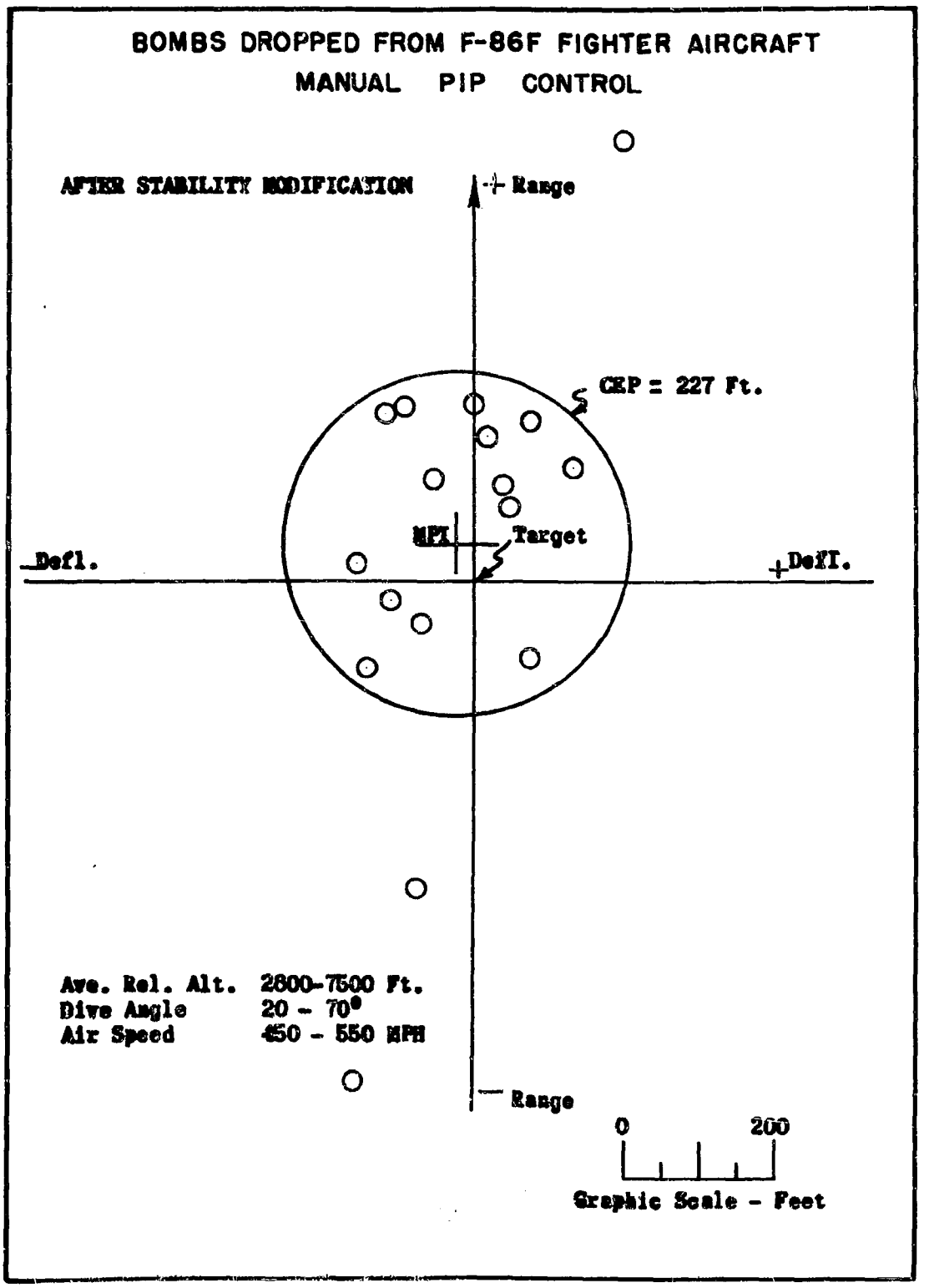
BOMBS DROPPED FROM F-86F FIGHTER AIRCRAFT

MANUAL PIP CONTROL SYSTEM

PRIOR TO STABILITY MODIFICATION
(Extracted from APGC
Final Report APG/TAT/90-A)



Appendix E


BOMBS DROPPED FROM F-86F FIGHTER AIRCRAFT
MANUAL PIP CONTROL
AFTER STABILITY MODIFICATION
+ Range
CEP = 227 Ft.
MPI
Target
Defl.
+Defl.
Ave. Rel. Alt. 2800-7500 Ft.
Dive Angle 20 - 70°
Air Speed 450 - 550 MPH
— Range
0
200
Graphic Scale - Feet

Appendix F

GUNNERY SCORES

F-86F Fighter Aircraft

Before Stability Modification

(Extracted from Final Report on Project No. APG/TAT/90-A.)

Sortie	Rounds Fired	Hits	% Hits
27-J-87	594	308	52
27-J-89	495	69	14
27-H-90	594	65	11
27-H-91	486	155	32
27-H-92	600	237	40
TOTAL	2769	834	30

After Stability Modification

Sortie	Rounds Fired	Hits	% Hits
2-M-2	397	71	18
2-M-3	390	166	43
2-T-4	600	181	30
2-T-5	523	105	20
2-M-6	600	447	75
2-M-7	600	365	61
2-V-8	600	119	20
2-T-9	600	165	31
TOTAL	4310	1639	38

Appendix G

AD 32259

Armed Services Technical Information Agency

ARLINGTON HALL STATION
ARLINGTON 12 VIRGINIA

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE MATERIEL COMMAND
WRIGHT-PATTERSON AIR FORCE BASE OHIO

FEB 19 2002

MEMORANDUM FOR DTIC/OCQ (ZENA ROGERS)
8725 JOHN J. KINGMAN ROAD, SUITE 0944
FORT BELVOIR VA 22060-6218

FROM: AFMC CSO/SCOC
4225 Logistics Avenue, Room S132
Wright-Patterson AFB OH 45433-5714

SUBJECT: Technical Reports Cleared for Public Release

References: (a) HQ AFMC/PAX Memo, 26 Nov 01, Security and Policy Review, AFMC 01-242 (Atch 1)

(b) HQ AFMC/PAX Memo, 19 Dec 01, Security and Policy Review, AFMC 01-275 (Atch 2)

(c) HQ AFMC/PAX Memo, 17 Jan 02, Security and Policy Review, AFMC 02-005 (Atch 3)

1. Technical reports submitted in the attached references listed above are cleared for public release in accordance with AFI 35-101, 26 Jul 01, *Public Affairs Policies and Procedures*, Chapter 15 (Cases AFMC 01-242, AFMC 01-275, & AFMC 02-005).

2. Please direct further questions to Lezora U. Nobles, AFMC CSO/SCOC, DSN 787-8583.

Lezora U. Nobles

LEZORA U. NOBLES
AFMC STINFO Assistant
Directorate of Communications and Information

Attachments:
1. HQ AFMC/PAX Memo, 26 Nov 01
2. HQ AFMC/PAX Memo, 19 Dec 01
3. HQ AFMC/PAX Memo, 17 Jan 02

cc:
HQ AFMC/HO (Dr. William Elliott)

DEPARTMENT OF THE AIR FORCE

HEADQUARTERS AIR FORCE MATERIEL COMMAND
WRIGHT-PATTERSON AIR FORCE BASE OHIO

DEC 19 2001

MEMORANDUM FOR HQ AFMC/HO

FROM: HQ AFMC/PAX

SUBJECT: Security and Policy Review, AFMC 01-275

1. The reports listed in your attached letter were submitted for security and policy review IAW AFI 35-101, Chapter 15. They have been cleared for public release.

2. If you have any questions, please call me at 77828. Thanks.

JAMES A. MORROW
Security and Policy Review
Office of Public Affairs

Attachment:
Your Ltr 18 November 2001

18 December 2001

MEMORANDUM FOR: HQ AFMC/PAX
Attn: Jim Morrow

FROM: HQ AFMC/HO

SUBJECT: Releasability Reviews

1. Please conduct public releasability reviews for the following attached Defense Technical Information Center (DTIC) reports:

   a. *Emergency Fuel Selector Valve Test on the J47-GE-27 Engine as Installed on F-86F Aircraft*, January 1955; DTIC No. AD- 056 013.

   b. *Phase II Performance and Serviceability Tests of the F-86F Airplane USAF No. 51-13506 with Pre-Turbine Modifications*, June 1954; DTIC No. AD- 037 710.

   c. *J-47 Jet Engine Compressor Failures*, 7 April 1952; DTIC No. AD- 039 818.

   d. *Evaluation of Aircraft Armament Installation (F-86F with 206 RK Guns) Project Gun-Val*, February 1955; DTIC No. AD- 056 763.

   e. *A Study of Serviced-Imposed Maneuvers of Four Jet Fighter Airplanes in Relation to Their Handling Qualities and Calculated Dynamic Characteristics*, 15 August 1955; DTIC No. AD- 068 899.

   f. *Fuel Booster Pump*, 6 February 1953; DTIC No. AD- 007 226.

   g. *Flight Investigation of Stability Fix for F-86F Aircraft*, 8 September 1953; DTIC No. AD- 032 259.

   h. *Investigation of Engine Operational Deficiencies in the F-86F Airplane*, June 1953; DTIC No. AD- 015 749.

   i. *Operational Suitability Test of the T-160 20mm Gun Installation in F-86F-2 Aircraft*, 29 April 1954; DTIC No. AD- 031 528.

   j. *Engineering Evaluation of Type T 160 Gun and Installation in F 86 Aircraft*, September 1953; DTIC No. AD- 019 809.

AFMC 01-2[illegible]

k. *Airplane and Engine Responses to Abrupt Throttle Steps as Determined from Flight Tests of Eight Jet-Propelled Airplanes*, September 1959; DTIC No. AD-225 780.

l. *Improved F-86F: Combat Developed*, 28 January 1953; DTIC No. AD- 003 153.

m. *Flight Test Progress Report No. 19 for Week Ending February 27, 1953 for Model F-86F Airplane NAA Model No. NA-191*, 5 March 1953; DTIC No. AD-006 806.

2. These attachments have been requested by Dr. Kenneth P. Werrell, a private researcher.

3. The AFMC/HO point of contact for these reviews is Dr. William Elliott, who may be reached at extension 77476.

JOHN D. WEBER
Command Historian

13 Attachments:
a. DTIC No. AD- 056 013
b. DTIC No. AD- 037 710
c. DTIC No. AD- 039 818
d. DTIC No. AD- 056 763
e. DTIC No. AD- 068 899
f. DTIC No. AD- 007 226
g. DTIC No. AD- 032 259
h. DTIC No. AD- 015 749
i. DTIC No. AD- 031 528
j. DTIC No. AD- 019 809
k. DTIC No. AD- 225 780
l. DTIC No. AD- 003 153
m. DTIC No. AD- 006 806